

**REMARKS**

This communication is responsive to Office Action of July 7, 2004 in which the following objections were raised: [1-2] Abstract is objected to because of its length and conciseness; [3] Claim 4 is objected to due to informalities; [4-5] Claims 1-3, 6-11 and 14-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Rybicki et al. (5,781,728); [6] Claims 1,4,5,9,12 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Mannering et al. (6,137,839).

Applicant has Amended all remaining Claims 1-9 and 17-20 and canceled Claims 10-16.

**1-2. ABSTRACT OBJECTED TO DUE TO LENGTH:**

Abstract is objected to because of its length and conciseness.

Applicant has amended the abstract in a manner believed to overcome the objection.

**3. CLAIM 4 OBJECTED TO DUE TO INFORMALITIES**

Claim 4 is objected to due to informalities.

Applicant has amended Claim 4, albeit not in direct accord with the Examiner's objection. Examiner will note that there is antecedent basis for '*communication medium*' in the preamble of amended Claim 1 from which amended Claim 4 depends. For this reason the objected to phrase has been amended to '*the communication medium*'.

**4-5. CLAIMS 1-3, 6-11, 14-20 REJECTED UNDER 35 U.S.C. 102(b) Rybicki et al.:**

Claims 1-3, 6-11 and 14-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Rybicki et al. (U.S. Patent No. 5,781,728).

Applicant has canceled Claims 10-16.

The Examiner has characterized the Rybicki reference as teaching a selectable tone spacing, variable interpolation and variable decimation (Office Action of July 7, 2004 at pages 3-4). Applicant respectfully rejects each of these characterizations.

The Rybicki reference teaches a pair of modems, one at the central office and one remote, which simultaneously support both ISDN communications and echo cancelled ADSL communications. To avoid what would otherwise be overlap between the upstream ADSL signal and the ISDN signal the upstream ADSL signal from the remote modem to the CO is shifted to frequencies above the ISDN band by the remote modem and then folded back into the traditional ADSL band by the receiver of the CO modem. Downstream communications from the CO modem to the remote modem are NOT subject to any imaging or folding procedures since any frequency overlap with the ISDN and downstream ADSL signal is slight and corrected by an adjustment of the high pass filter to a slightly higher frequency. *"ADSL transceiver 34 includes an ADSL transmitter in accordance with the present invention, as illustrated in detail in FIG. 4, FIG. 6, FIG. 8, or FIG. 10. ADSL transceiver 34 transmits an upstream ADSL signal across twisted pair 18 to ADSL central office 40. ADSL transceiver 42 and central office 40 includes one of the receivers illustrated in FIG. 12, FIG. 14, FIG. 16, or FIG. 18 and receives the upstream data signal from ADSL transceiver 34. As will be described later and in more detail, ADSL transceiver 34 shifts or modifies the upstream ADSL signal up to a higher frequency band than that used by an ISDN network. The modified upstream ADSL signal can be transmitted along twisted pair 18 simultaneously with the ISDN signal. An ADSL receiver of ADSL transceiver 42 of the central office 40 band pass filters the ISDN signal and returns the modified upstream ADSL signal back to its original spectral band where it is converted to digital output data for use by a DSP. The downstream ADSL from ADSL central office 40 is modified so that it does not use the frequency band occupied by the ISDN signal. This modification is accomplished by changing the cut off frequency of the high pass filter of the downstream transmitter of ADSL transceiver 42 and of the high pass filter of the downstream receiver of ADSL transceiver 34."* (Rybicki at col 5, lines 19-39).

The shifting of the upstream signal to a higher range of frequencies is accomplished by using a fixed amount of interpolation at the output of the IFFT and a fixed processing interval for the IFFT. (Rybicki FIGS. 4 and 6 references 110 and 106) The shifting initially results in spectral content from both the downstream bandwidth as specified by the ADSL standard along with an image as shown at reference 112 on FIGS. 5 and 7. Both the original and image occupy the same 138kHz frequency range, both contain identical information, and both have the same tone spacing as specified by the standard. At no time is the processing interval of the IFFT altered.

In the Applicant's claimed invention by contrast selection of a processing interval for the time-to-frequency and frequency-to-time domain transformation of each successive tone set is a claimed limitations which has the effect of varying tone spacing as shown throughout the Applicant's specification and specifically in FIGS. 3-5 and the accompanying text. This limitation is found in remaining independent Claims 1 and 17 and by extension to all remaining Claims depending there from as follows:

*“...a digital signal processor (DSP) configured to select a processing interval inversely corresponding with bandwidth availability on the communication medium for transforming each set of tones associated with the at least one multi-tone modulated communication channel between a time domain and a frequency domain, whereby an initial determination of a relatively high bandwidth availability on the communication medium results in a selection of a relatively shorter processing interval for each tone set and a correspondingly greater number of tone sets processed in a given amount of time, thereby increasing a bandwidth of the multi-tone modulated communication channel by increasing the bandwidth of each individual tone within each set of tones and vice versa.”* (Applicant's amended Claim 1, emphasis added)

*“...determining a bandwidth availability for the at least one multi-tone modulated communication channel on the communication medium;*

selecting a processing interval for each successive set of tones of the at least one multi-tone modulated communication channel based on the bandwidth availability determined in the determining act;

transforming each successive set of tones in the processing interval selected in the selecting act between a time domain and a frequency domain to demodulate the at least one multi-tone modulated communication channel and vice-versa, whereby the determination in the determining act of a relatively high bandwidth availability on the communication medium results in a selection in the selecting act of a relatively shorter processing interval for each successive set of tones and a correspondingly greater number of tone sets processed in a given amount of time, thereby increasing a bandwidth of the multi-tone modulated communication channel by increasing the bandwidth of each individual tone within each set of tones and vice versa." (Applicant's amended Claim 17, emphasis added)

Since the Rybicki reference does not disclose the claimed limitation of a selection based on bandwidth availability of a processing interval for successive tone sets of a multi-tone modulated communication channel it is respectfully suggested that Independent Claims 1 and 17 have been amended in a form to overcome the Examiner's rejection and the Applicant respectfully requests that that rejection be withdrawn. Remaining Claims depend directly or indirectly from a corresponding one of Claims 1 and 17 and are also believed to have been placed in a condition to overcome the rejection for the reasons discussed above and for other reasons of independent significance.

**6. CLAIMS 1, 4-5, 9, 12-13 REJECTED UNDER 35 U.S.C. 102(e) Mannering et al.:**

Claims 1,4,5,9,12 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Mannering et al. (U.S. Patent No. 6,137,839).

Applicant has reviewed the cited portions of the Mannering specification and finds therein no teaching of the claimed limitation of a selection based on bandwidth

availability of a processing interval for successive tone sets of a multi-tone modulated communication channel. Applicant therefore respectfully suggests that Independent Claims 1 and 17 have been amended in a form to overcome the Examiner's rejection and the Applicant respectfully requests that that rejection be withdrawn. Remaining Claims depend directly or indirectly from a corresponding one of Claims 1 and 17 and are also believed to have been placed in a condition to overcome the rejection for the reasons discussed above and for other reasons of independent significance.

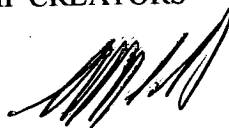
### **CONCLUSION**

In view of the above remarks, and the amendments to the Claims, Applicant believes that all remaining Claims 1-9 and 17-20 have been placed in a condition for allowance, and requests that they be allowed. Early notice to this effect is solicited.

The Commissioner is authorized to charge any additional fees which may be required, including petition fees and extension of time fees, to Deposit Account No. 50-1338 (Docket No. **VELCP010X1**).

Respectfully submitted,

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